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# Obsessive-compulsive disorder in children and adolescents

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## ABSTRACT

Obsessive-compulsive disorder (OCD) in childhood and adolescence is an impairing condition, associated with a specific set of distressing symptoms incorporating repetitive, intrusive thoughts (obsessions) and distressing, time-consuming rituals (compulsions). This review considers current knowledge of causes and mechanisms underlying OCD, as well as assessment and treatment. Issues relating to differential diagnosis are summarised, including the challenges of distinguishing OCD from autism spectrum disorders and tic disorders in youth. The recommended treatments, namely cognitive behaviour therapy and serotonin reuptake inhibiting/selective serotonin reuptake inhibitor medications, are outlined along with the existing evidence-based and factors associated with treatment resistance. Finally, novel clinical developments that are emerging in the field and future directions for research are discussed.

## EPIDEMIOLOGY

Obsessive-compulsive disorder (OCD) is a psychiatric condition characterised by persistent and unwanted intrusive thoughts, images and urges (obsessions) and repetitive behaviours or mental acts (compulsions) (see [table 1](#)). Once considered to be rare in youth, epidemiological studies have found an estimated prevalence of 0.25%–4% among children and adolescents.<sup>1–3</sup> Left untreated symptoms may wax and wane but typically follow a chronic course<sup>4, 5</sup> and cause marked functional impairment across multiple domains, including at home, school and socially.<sup>6</sup> Furthermore, paediatric OCD is associated with increased risk of other psychiatric disorders in adulthood.<sup>7, 8</sup>

## AETIOLOGY

The aetiology of paediatric OCD remains relatively poorly understood, despite considerable research to date. Data from twin, family and segregation studies strongly support a genetic component.<sup>9</sup> Twin studies have shown that genetic factors explain 45%–65% of the variance of OCD in children,<sup>10</sup> pointing to a higher heritability in OCD relative to most other anxiety disorders and depression in youth.<sup>11</sup> Interestingly, the heritability of OCD appears to be greater in paediatric compared with adult cohorts,<sup>10</sup> supporting the notion of early-onset OCD as a putative developmental subtype of the disorder. The results of genome-wide association studies<sup>12, 13</sup> and meta-analyses of candidate gene studies<sup>14</sup> suggest that the genetic influence on OCD is polygenic, with many genes involved which individually exert a relatively small effect on the phenotype. In particular, genes within the serotonergic, dopaminergic and glutamatergic system appear to influence OCD.<sup>15</sup>

Neuropsychological models of OCD propose that OCD arises from alterations to frontostriatal circuitry. Hyperactivation of the orbitofrontal cortex has been proposed to mediate persistent thoughts about threat and harm (ie, obsessions), which in turn lead to attempts to neutralise the perceived threat (ie, compulsions). There is robust evidence from functional neuroimaging studies of increased activation in the lateral and medial orbitofrontal cortex in both children and adults with OCD.<sup>15</sup> Interestingly, orbitofrontal brain dysfunction has also been found in unaffected relatives of patients with OCD, who are at genetic risk of OCD.<sup>16</sup> Importantly, treatment studies have demonstrated reduced activation in the orbitofrontal cortex following cognitive behaviour therapy (CBT) for OCD,<sup>15</sup> demonstrating some degree of plasticity.

While genetic factors clearly influence the expression of OCD, environmental factors also play a significant role, but remarkably little is known about these effects. Few prospective studies have been conducted, and results have been inconsistent. For example, one longitudinal study found that social isolation, physical abuse and negative emotionality were specific predictors of an adult OCD diagnosis.<sup>17</sup> In contrast, a recent retrospective study found no evidence for an association between adverse childhood experiences and OCD, although such experiences were related to certain comorbidities, including depression.<sup>18</sup>

There has been emerging clinical evidence over the past 10–15 years of a subgroup of children who experience sudden onset OCD and/or tics after streptococcal infection. This group of children was originally given the acronym PANDAS (paediatric autoimmune neuropsychiatric disorders associated with streptococcus),<sup>19</sup> but more recently the term PANS (paediatric acute-onset neuropsychiatric syndrome) has been used in preference, as it is felt to capture both the sudden onset and the uncertainty about aetiology.<sup>20</sup> These children tend to have more widespread neuropsychiatric difficulties than other children with OCD, including enuresis, deterioration in handwriting and impulsivity. The exact mechanism of sudden onset neuropsychiatric disorder is unknown, but there has been interest in delivering therapies that target immune and infectious causes. However, other small studies suggest that OCD in this population responds as well to standard treatments, and effectiveness of prophylactic antibiotics has been inconsistent.

## DIAGNOSTIC CRITERIA AND CLASSIFICATION

The diagnosis of OCD in young people is broadly similar to adults (see [box 1](#) for the International Classification of Diseases (ICD) diagnostic criteria).



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## Review

**Table 1** Description of obsessions and compulsions

	Obsessions	Compulsions
Definition	Recurrent, unwanted and persistent thoughts, images or urges that cause marked distress	Repetitive behaviours or mental acts that are often driven by rigid rules and performed in an attempt to reduce anxiety
Common themes	Contamination	Washing and cleaning
	Aggressive/harm	Checking
	Sexual	Reassurance seeking
	Religious	Repeating
	Making things 'just right'	Ordering and arranging

However, it has been noted that children are less likely to have insight into the irrationality of their obsessions and compulsions,<sup>21</sup> presumably due to underdeveloped meta-cognitive skills. Furthermore, in children, it is important to differentiate true compulsions from normal routines or ritualised behaviours, which are typically transient and no cause for concern. For example, many children display specific routines at bedtime such as saying goodnight in a particular way to their parents and/or toys.<sup>22</sup> In order to be considered a compulsion, a behaviour must be distressing and/or impairing.

Historically OCD has been considered to be an anxiety disorder. Indeed, OCD is listed as a 'neurotic, stress-related and somatoform disorder' along with anxiety disorders in ICD-10, and similarly it was classified as an anxiety disorder in the Diagnostic and Statistical Manual of Mental Disorders (DSM)-III, DSM-III-R and DSM-IV. However, in light of accumulating evidence for key differences in the phenomenology and aetiology of OCD compared with other anxiety disorders,<sup>23</sup> its classification has changed within DSM-5 and it now falls

within the new 'OCD and related disorders' section. This section also includes a number of other disorders that are characterised by repetitive thinking and repetitive behaviour, such as body dysmorphic disorder, hoarding disorder and trichotillomania.

## ASSESSMENT AND DIAGNOSIS

OCD typically goes undetected for many years before an accurate diagnosis is made.<sup>24</sup> Delays in detection in young people may reflect embarrassment and attempts to conceal symptoms, poor insight and/or difficulty differentiating true OCD from normative rituals during development.<sup>25</sup> Furthermore, while OCD is often associated with a characteristic set of symptoms (eg, excessive washing, repeated checking), the disorder is strikingly heterogeneous; two individuals with OCD may present with entirely non-overlapping symptom profiles, which can present a diagnostic challenge. Nevertheless, the majority of paediatric OCD cases be identified using a six-question screening instrument, the Short OCD Screener (SOCS), recommended by the National Institute for Health and Clinical Excellence (see box 2).<sup>26</sup> The SOCS has been found to have a sensitivity of 97% (95% CI 0.91 to 0.98) in detecting OCD. As it is not a diagnostic instrument, further assessment is required in individuals who screen positive including taking a detailed history of obsessions and compulsions, a developmental history and a separate interview with the young person.<sup>27</sup> The latter is particularly important given that 'taboo' obsessions, such as sexual obsessions, are common and the young person may be reluctant to disclose them in front of relatives.<sup>28</sup>

## DIFFERENTIAL DIAGNOSIS

Differential diagnosis can be challenging, particularly in paediatric populations; three of the most complex differential diagnoses are outlined below.

Restricted interests and stereotyped behaviours are a core feature of autism spectrum disorders (ASDs) and may result in both cognitive preoccupations and repetitive behaviours. Stereotyped behaviours can manifest as a phenocopy of compulsions (eg, ordering and arranging toys) and it is crucial to delineate ASD-related behaviours from true compulsions in order to inform treatment. In contrast to autism-related stereotyped behaviours, compulsions are usually (a) preceded by an obsession, (b) associated with relief in anxiety and (c) egodystonic (ie, unwanted and inconsistent with the individual's fundamental values) and the behaviour itself is not experienced as being intrinsically pleasurable. Of course, a young person may present with both ASD and OCD, and indeed prevalence rates of OCD are significantly elevated among individuals with ASD.<sup>29</sup>

### Box 1 International Classification of Diseases-10 diagnostic criteria for obsessive-compulsive disorder

1. Either obsessions or compulsions or both present on most days for a period of 2 weeks.
2. Obsessions (unwanted ideas, images or impulses that repeatedly enter a person's mind) and compulsions (repetitive stereotyped behaviours or mental acts driven by rules that must be applied rigidly) share the following features:
  - ▶ Patient is aware that these originate from their own mind.
  - ▶ They are repetitive, unpleasant and distressing to the patient. At least one is perceived as excessive or unreasonable ('egodystonic').
  - ▶ At least one is resisted unsuccessfully, even though others may be present that the sufferer no longer resists.
  - ▶ Thought of carrying out the obsession or compulsion is not intrinsically pleasurable (simple relief of tension momentarily on completion of the thought/act is not regarded as pleasure in this sense).
3. The symptoms must be disabling. Even young children will have some insight into the senselessness of the thoughts and behaviours.

### Box 2 Short obsessive-compulsive disorder screener

1. Do you wash or clean a lot?
2. Do you check things a lot?
3. Is there any thought that keeps bothering you that you would like to get rid of but cannot?
4. Do your daily activities take a long time to finish? (eg, getting ready for school)
5. Are you concerned about putting things in a special order or are you very upset by mess?
6. Do these problems trouble you?

Detecting and treating OCD in the context of ASD can significantly improve functioning and quality of life.<sup>30</sup>

Another common differential diagnosis is OCD and tic disorders. Up to 59% of children and adolescents with OCD meet criteria for a diagnosis of a tic disorder at some point during their lifetime.<sup>31</sup> Individuals with comorbid tic disorders may display an earlier age of onset of OCD and a different symptom profile compared with those without tic disorders.<sup>32</sup> Complex tics, in particular, can be difficult to differentiate from compulsions: as with autism-related stereotyped behaviours, the behaviour itself can appear identical to a compulsion (eg, touching and tapping). However, while tics are largely involuntary, compulsions are performed deliberately to relieve anxiety. The level of complexity of the behaviour may also help to differentiate tics from compulsions; even complex tics are relatively straightforward behaviours (eg, a brief tapping action), whereas compulsions are often more elaborate and performed according to a rule (eg, tapping four times with the left hand and four times with the right hand). Differentiating an OCD component is important, as OCD treatments are effective in children with tics and OCD, and OCD can be the most impairing aspect of their condition.<sup>33</sup>

A third differential diagnosis that can be challenging is psychosis and OCD. The bizarre nature of obsessional thoughts can often raise queries of psychotic phenomena, especially in cases where the young person has limited insight into the irrationality of their obsessions. For example, a proportion of young people with OCD present with 'transformation obsessions', which refers to a fear of turning into someone or something else or acquiring unwanted characteristics.<sup>34</sup> These unusual symptoms can easily be confused with delusions, leading to inappropriate treatment.<sup>34</sup> Similarly, aggressive obsessions such as a fear of being harmed can appear similar to paranoia. In cases of OCD, the individual may have some insight into the irrationality of their fears; the obsessional thought is unlikely to be part of a broader delusional set of beliefs (eg, a plot of how and why others would want to harm them); and other symptoms of OCD are likely to be present upon questioning whereas other symptoms of psychosis (such as hallucinations and thought-disorder) are absent.

## TREATMENT

There are two treatments with an established evidence base in the treatment of paediatric OCD, namely CBT incorporating exposure with response prevention (E/RP) and selective serotonin reuptake inhibitors (SSRIs).<sup>35</sup> CBT for paediatric OCD is a relatively short-term treatment, usually consisting of 12–20 weekly sessions. The main therapeutic strategy is E/RP, which involves the young person gradually confronting their feared situations (eg, touching dirty door handles) and refraining from carrying out compulsions (eg, handwashing) in an attempt to neutralise their anxiety or feared outcome. Instead, the young person is encouraged to wait until their anxiety comes down naturally, and then to repeatedly practice the same E/RP task until their anxiety extinguishes altogether (ie, habituation). E/RP tasks are set up in graded way, as guided by a hierarchy, and are carried out in sessions with the therapist and in between sessions as homework.

Randomised controlled trials (RCTs) have demonstrated that CBT is an efficacious treatment for paediatric OCD. The treatment is associated with a 40%–65% reduction in symptoms<sup>36</sup> and can be effective for children as young as 3 years when delivered in a developmentally appropriate format.<sup>37</sup> Gains appear to be relatively enduring and have been shown to be maintained

up to 18-month follow-up.<sup>38</sup> Encouragingly, similar outcomes have been observed in community clinics (ie, non-research settings), suggesting that CBT protocols are effective in routine clinical practice.<sup>39 40</sup>

In line with the robust evidence base, there is international consensus that CBT should be offered to all young people with OCD and should be the first-line treatment in mild to moderate cases of OCD.<sup>35 41</sup> In more severe cases or where young people fail to respond to CBT, medication should be considered in addition to CBT. RCTs have shown a range of SSRIs (fluoxetine, sertraline, paroxetine, fluvoxamine, citalopram) to be effective in the treatment of paediatric OCD; they are associated with a 29%–44% reduction in symptoms and appear to be well tolerated and safe.<sup>36</sup> Few comparative treatment trials of different SSRIs have been undertaken, so there is little or no evidence to suggest that any one SSRI is more effective than another. However, in the UK, currently only sertraline and fluvoxamine are licensed for use in children, with sertraline recommended because of its favourable side effect profile.

Only one study to date has directly compared the efficacy of CBT versus SSRI medication in paediatric OCD.<sup>42</sup> This study found that CBT and sertraline were associated with comparable levels of symptom reduction, but that combined CBT and SSRI treatment was associated with superior outcomes. More recently, the same group has investigated the extent to which CBT improves outcomes among young people receiving SRIs for OCD.<sup>43</sup> They found that the individuals who received CBT compared with medication management alone had better outcomes, indicating that the combination of CBT and medication is superior to medication as a monotherapy in paediatric OCD. Interestingly, young people who received brief CBT instructions did not show any better response than those who received medication alone, suggesting that a truncated form of CBT is not effective in this population.

## TREATMENT-RESISTANT OCD

A proportion of young people with OCD do not respond to CBT or SSRIs, and an even larger proportion make gains but are left with clinically significant residual symptoms. A number of studies have attempted to identify predictors of treatment response in an attempt to understand the mechanisms underlying treatment resistance. Perhaps, most attention has been given to the impact of comorbidity on treatment response. Comorbidity is common in paediatric OCD, with up to 80% meeting diagnostic criteria for an additional psychiatric disorder.<sup>42</sup> Although some comorbidities, such as depression and anxiety disorders, do not appear to affect response to CBT or SSRIs, others may have an impact. For example, individuals with comorbid tic disorders tend to have a poorer response to SSRIs but respond equally well to CBT compared with those without tics.<sup>44</sup> Externalising disorders (oppositional defiant disorder and conduct disorder) have been shown to predict a worse response to SSRIs and CBT,<sup>44</sup> and there is some suggestion that individuals presenting with this dual diagnosis would benefit from modified treatment approaches, such as CBT combined with parent management training.<sup>45</sup> Similarly, it has been suggested that individuals with ASDs respond less well to CBT for OCD, highlighting the need for modified CBT protocols in this group.<sup>46</sup>

Children with OCD who fail to respond to a course of CBT and an initial SSRI administered for at least 12 weeks at the maximum tolerated dose should usually have additional trials of at least one other SSRI. The tricyclic drug clomipramine (a non-SSRI) may be a useful medication to trial in resistant cases where two or more



## Review

SSRIs have failed, although it is less well tolerated than SSRIs. There is also some RCT evidence in adults, and emerging evidence in children that augmentation of SSRI medication with a low dose of a dopamine antagonist can improve response rate, with up to 50% of previous non-responders showing improvement.<sup>47</sup> However, studies have variable outcomes, and a recent RCT in adults who had been non-responsive to SSRIs demonstrated that delivering high-quality exposure-based CBT was more efficacious than risperidone augmentation.<sup>48</sup> The key message again for treatment in children with OCD is that they should have access to exposure-based CBT and that risperidone augmentation is a less-favourable option.

## FUTURE DIRECTIONS

A major clinical challenge is the dissemination of good quality CBT to young people with OCD. Unfortunately, the vast majority of OCD sufferers fail to access CBT due to geographical barriers and/or a shortage of appropriately trained therapists.<sup>49</sup> In recent years, research has begun to focus on developing evidence-based methods for increasing the availability of, and access to, CBT. Novel approaches that have shown promise include CBT delivered via telephone<sup>50</sup> or web-camera<sup>51</sup> and internet CBT with minimal therapist input.<sup>52</sup> While further validation is required, these methods have the potential to transform service delivery for this population.

In addition to efforts to disseminate current evidence-based treatments for paediatric OCD, recent research has also focused on ways of enhancing CBT in order to improve outcomes, particularly for the significant minority who do not benefit from existing CBT protocols. For example, family conflict and parental blame have been shown to be associated with poorer CBT outcome in young people with OCD<sup>53</sup> and pilot data suggest that family therapy specifically aimed at targeting these dynamics is an effective adjunct to CBT in families that present with these difficulties.<sup>54</sup> With respect to pharmacological developments, in recent years there has been increasing interest in the use of d-cycloserine (DCS) as a potential augmentation strategy for CBT for OCD. DCS is a partial *N*-methyl-D-aspartate receptor agonist and animal studies have shown that DCS enhances extinction learning, which has raised the question of whether DCS could augment exposure-based therapies for anxiety disorders. However, findings remain mixed with some studies demonstrating an augmentation effect of DCS on CBT for OCD,<sup>55</sup> but not others.<sup>56</sup> These discrepancies may reflect methodological differences between studies, and further research is needed to establish the possible value of DCS in treating OCD in youth.

## CONCLUSIONS

OCD commonly starts in childhood, and in addition to causing significant distress and impairment in children, it can persist into adult life where the WHO ranks it as one of the most impairing illnesses.<sup>57</sup> National guidelines exist for the assessment and treatment of OCD, and children should be offered interventions according to guidelines incorporating these evidence-based treatments. A substantial proportion of children and adolescents will respond with full or partial remission to CBT, which may be combined with an SRI/SSRI. Unfortunately, inadequate provision of CBT means limitations in access to treatments, and current research aims to establish more accessible and economic formats of CBT. Ongoing research into the genetic and biological basis of OCD and its relationship with infections/autoimmunity may also in time increase understanding of mechanisms and offer new treatment possibilities.

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# Obsessive-compulsive disorder in children and adolescents

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